November 24, 1997

EA #97-481

Mr. N. S. Carns
Senior Vice President and
Chief Nuclear Officer
Northeast Nuclear Energy Company
P. O. Box 128
Waterford, Connecticut 06385-0128

SUBJECT: EMERGENCY PREPAREDNESS INSPECTION OF THE MILLSTONE STATION AUGUST 21, 1997, NRC/FEMA GRADED PLUME EXPOSURE EXERCISE, AND THE EMERGENCY PREPAREDNESS PROGRAM FOR RESTART (50-245, 336, 423/97-81)

Dear Mr. Carns:

This letter refers to the emergency preparedness exercise inspection led by Mr. J. Lusher, at Millstone Station, Waterford, Connecticut, during the period of August 20-22, 1997, and the emergency preparedness program inspection during the period of August 23-29, 1997.

Overall, your site emergency response organization's (SERO) performance was good. No exercise weaknesses were identified. Good command and control were demonstrated in all emergency response facilities. Communications within and between facilities, and with the State of Connecticut were good. Your staff adequately demonstrated the ability to implement the emergency plan.

During the emergency preparedness program inspection, the inspectors identified instances where emergency response facilities were not maintained in accordance with the emergency plan. They found training and procedures for dose assessment were not effective in assuring that personnel could perform radiological dose assessment activities in a timely manner. Further, the inspectors found that Revision 22 of the Emergency Plan, made in June 1997, decreased the effectiveness of the emergency plan and the revision was implemented without the required approval by the NRC. The NRC team is concerned these discrepancies were not identified at Millstone Station by your team. These items are considered apparent violations of NRC requirements.

Your emergency response personnel, facilities and equipment, self-assessment, and the corrective actions, implemented at Millstone, as a consequence of the Haddam Neck exercise problems, adequately demonstrated the ability to implement your emergency plan during the exercise. However, this review of the emergency preparedness program indicates that some elements need improvement prior to restart of any unit.

Based on the results of this inspection, the apparent violations are being considered for escalated enforcement action in accordance with the "General Statement of Policy and Procedure for NRC Enforcement Actions" (Enforcement Policy, NUDGE-1600). Accordingly, no Notice of Violation is presently being issued for these inspection findings. In addition, please be advised that the number and characterization of apparent violations described in the enclosed inspection report may change as a result of further NRC review.

An enforcement conference to discuss these apparent violations will be scheduled in the near future. The purposes of this conference are to discuss the apparent violations, their causes and safety significance; to provide you the opportunity to point out any errors in our inspection report; and to provide an opportunity for you to present your proposed corrective actions. In addition, this is an opportunity for you to provide any information concerning your perspective on (1) the severity of the issue, (2) the factors that the NRC considers when it determines the amount of a civil penalty that may be assessed in accordance with Section VI.B.2 of the Enforcement Policy, and (3) the possible basis for exercising discretion in accordance with Section VII of the Enforcement Policy. You will be advised by separate correspondence of the results of our deliberations on this matter. No response regarding the apparent violations is required at this time. However, any corrective actions deemed appropriate should be implemented in a timely manner.

This enforcement conference will be open to public observation in accordance with the Commission's trial program as discussed in the enclosed *Federal Register* notice (Enclosure 2). Although not required, we encourage you to provide your comments on how you believe holding this conference open to public observation affected your presentation and your communications with the NRC.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter and its enclosure will be placed in the NRC Public Document Room.

We appreciate your cooperation.

Sincerely,

ORIGINAL SIGNED BY:

James T. Wiggins, Director
Division of Reactor Safety

Docket Nos. 50-245; 50-336; 50-423

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U. S. NUCLEAR REGULATORY COMMISSION
REGION I

Report Nos.	50-245, 336, 423/97-81
License Nos.	DRP-21, DRP-65, NPF-49
Licensee:	Northeast Nuclear Energy Company P. O. Box 128 Waterford, Connecticut 06385-0128
Facility:	Millstone Nuclear Power Station
Dates:	August 20 through September 8, 1997
Inspectors:	John H. Lusher, Lead, Emergency Preparedness Specialist, RI William A. Maier, Emergency Preparedness Specialist, RI Daniel M. Barss, Emergency Preparedness Specialist, NRR/PERB Edwin E. Fox, Jr., Sr. Emergency Preparedness Specialist, NRR/PERB David M. Schultz, COMEX Gary W. Bethke, COMEX
Approved by:	Michael C. Modes, Chief Emergency Preparedness and Safeguards Branch Division of Reactor Safety

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EXECUTIVE SUMMARY

MILLSTONE NUCLEAR POWER STATION
Full-participation Emergency Preparedness Exercise Evaluation
August 20 through September 8, 1997
Inspection Report 50-245, 336, 423/97-81

EMERGENCY PREPAREDNESS EXERCISE

- Overall the licensee site emergency response organization (SERO) performance was good.
- No exercise weaknesses were identified.
- Good command and control were demonstrated in all emergency response facilities.
- Communications within and between facilities, and with the State of Connecticut were good.
- The licensee adequately demonstrated its ability to implement the emergency plan. However, during the exercise a concern was identified that the Unit 1 emergency action levels CNB4 and CNB5 as phrased could cause a possible over classification of emergency events from a Site Area emergency to a General Emergency.

EMERGENCY PREPAREDNESS PROGRAM INSPECTION

During the emergency preparedness program inspection for restart the inspectors identified activities which apparently were not conducted in accordance with your license requirements. Problems included:

- (1) Instances of failure to maintain emergency response facilities in accordance with the emergency plan.
- (2) Failure to provide adequate dose assessment training procedures sufficient to assure that personnel could perform radiological dose assessment activities in the timely manner.
- (3) Emergency Plan Revision 22, implemented in June 1997, decreased the effectiveness of the emergency plan and that plan revision was implemented without receiving the required prior approval by the NRC.
- Additionally, the NRC team was concerned that these discrepancies were not identified at Millstone Station by the required audit program.

- An additional concern of the NRC team was that the audit conducted did not appear to include all elements of 10CFR50.54(t) such as evaluation for adequacy of emergency preparedness program capabilities and procedures.

Although your emergency response personnel, facilities and equipment, self-assessment, and the corrective actions, implemented at Millstone as a consequence of the Haddam Neck exercise problems, adequately demonstrate the ability to implement your emergency plan during the exercise, the review of the emergency preparedness program indicates that some elements do not support restart.

REPORT DETAILS

EMERGENCY PREPAREDNESS EXERCISE

P4 Staff Knowledge and Performance

a. Exercise Evaluation Scope

The NRC inspectors evaluated the performance of the licensee's emergency response organization (ERO) during the biennial, full-participation exercise. The inspectors assessed various aspects of emergency response, including recognition of abnormal plant conditions, classification of emergency conditions, and notification of offsite agencies. The inspectors evaluated the licensee's self-assessment of the exercise.

b. Emergency Response Facility Observations and Critique

b.1 Simulator Control Room (SCR)

The control room crew promptly initiated accountability procedures for the Plant Equipment Operator (PEO) at the scene of the emergency diesel room fire, concluding that search and rescue was not required. The crew conservatively requested fire and ambulance support from offsite in the event conditions worsened.

The Shift Manager (SM), after consultation with the Shift Technical Advisor (STA), promptly and properly recognized the adverse effect of the diesel generator fire on safety functions and correctly classified the event as an Alert within four minutes of event notification.

The Shift Technician (communicator) and Station Duty Officer promptly integrated their efforts into the control room crew structure, and effectively relieved the Shift Manager of many administrative details such as notifications and tracking of health physics and chemistry technicians dispatched by the SM into the plant, while keeping the SM appropriately informed as activities were accomplished. As a consequence, correct notifications for the Alert were initiated ten minutes after classification for local authorities and to the NRC within thirty minutes.

The SM properly implemented EPOP 4411, “Director of Station Emergency Operations (Rev. 5, 5/5/97),” utilizing the procedure as a checklist for accomplishing required activities. The sequence prescribed by the procedure resulted in the SM not ordering the station public address system announcement concerning EDG fire location, classification, and ERO activation until eighteen minutes after the event initiation. ONP 505, Fire (Rev. 4, 1/1/97), specifically requires the CR Operator to make a plant page announcement concerning the fire location and activation of the Fire Brigade, but the page announcement was not made due to controller-induced, exercise artificialities. A public address

system announcement to warn emergency response personnel was not made at 1310; when the CR staff became aware of the radiological release to the environs. As a consequence, ERO members may not have been aware of adverse changing plant conditions in a timely manner.

The Unit Supervisor and SM performed frequent briefings for CR crew members as occasioned by changes in plant conditions that kept all members of the CR response team fully aware of plant status and significant response actions. The CR crew demonstrated a strict discipline of closed loop communications for reports and orders. Control room protocol maintained a noise-free environment.

b.2 Technical Support Center (TSC)

The TSC was activated exactly one half hour after the Site Emergency Response Organization (SERO) pager activation. The additional team responders assigned to the unaffected units quickly assumed support roles that enhanced the response. Assigned responsibilities of all responders were unambiguous, and the team performed well together. There was adequate staff present to conduct all the tasks prescribed by the emergency plan.

The ADTS made two decisions without adequately assessing the consequences of the decisions. In one case, he ordered the relocation of the OSC assembly area personnel to the refueling outage building (ROB) without assessing the radiological conditions of the destination. The radiation levels at the ROB were greater than the area the personnel were being evacuated from. The ADTS discovered this from his discussion with the Director of Station Emergency Operations. The evacuees learned this from a returning radiation monitoring team, and the evacuation was redirected to a safer location.

In another case, the ADTS ordered the stopping of the main stack exhaust fan after the pressurized drywell was vented via the main ventilation exhaust duct. The accident management team leader (AMTL) reported in an earlier briefing that the vent ducting, having been pressurized, may have exceeded its design pressure and had been breached. The AMTL mentioned that this condition could result in an unmonitored ground release. The ADTS ordered the exhaust fan stopped without considering the effects of this action on increasing the potential unmonitored release rate through such a breach in the vent duct. He did not coordinate his intended action with the radiological consequence or dose assessment personnel in the EOF to allow for their increased surveillance of any possible ground releases resulting from this action.

General Emergency (GE) Classification

The ADTS made two classifications during the exercise. He classified events using input from the Manager of Control Room Operations (MCRO) and the Senior Reactor Operator (SRO) phone talker in the TSC. The ADTS classified the Site Area Emergency condition quickly and accurately. He classified a GE condition shortly after the loss of reactor coolant accident (LOCA) occurred, but the basis for the classification was erroneous.

The ADTS classified the GE based on the loss of all three fission product barriers, although the primary containment barrier was still intact. The Director of Site Emergency Operations (DSEO) in the EOF questioned this classification, and the ADTS later modified his basis for the GE declaration. The GE classification was not changed because, in the judgement of the ADTS, the containment barrier was potentially lost.

Emergency action level (EAL) CNB5 permits this judgement classification if conditions, such as, area radiation monitor readings in alarm or offscale high are present. Reactor building radiation monitors were all in alarm after the LOCA occurred. The ADTS concluded, based on this determination, that plant conditions resulted in the loss of two of the three fission product barriers with a potential loss of the third barrier. These conditions satisfied the criteria for a GE declaration.

The updated GE classification, while satisfying the EAL requirements of the barrier failure reference table, was still incorrect since the containment barrier was not degraded due to release of radioactive material from the containment. The inspectors concluded that inadequate procedures were the cause of the ADTS making an inappropriate classification.

EAL CNB5, in EPIP 4400, "Event Assessment, Classification and Reportability," allows the classifying official to conclude that the containment barrier is lost or potentially lost based on certain plant conditions which may exist. One such condition, as mentioned before, is area radiation monitor alarms or offscale high readings. During the exercise, these conditions existed in the reactor building following the release of radioactive material to the drywell, but the radiation levels resulted from the radioactive material inventory that was being contained in the drywell, not from a release of radioactive material. In such a case, no loss or potential loss of the containment barrier existed although the ADTS concluded otherwise from the EAL.

This problem also exists with EAL CNB4, which recognizes a loss of the containment barrier from unisolable primary system leakage outside the drywell. This EAL also lists area radiation monitor alarms as an indication of the condition. Although this EAL closely follows the guidance given in the NRC-accepted generic EAL guidance upon which EAL CNB4 is based, applying this EAL in such conditions as existed during the exercise would erroneously give indications of a loss of all three barriers when, in fact, only two barriers were lost.

The inspector discussed the expected reactor building radiation readings with the licensee's Radiological Assessment Branch management, who informed them that the radiation readings simulated in the exercise would be expected for the level of core damage simulated in the exercise (approximately 5% of the fuel gap activity). EALs CNB4 and CNB5, as currently worded, could result in overclassification of an event in which the RCS barrier was lost with a moderate amount of core damage even with the containment barrier intact. The potential overclassification of events associated with EALs CNB4 and CNB5 is classified as an inspector follow item. (IFI 50-245, 336, 423/97-81-01)

b.3 Operations Support Center (OSC)

The OSC was staffed and activated within 22 minutes of the Alert declaration by the necessary positions for minimum staffing. Shortly thereafter, additional personnel reported to the facility so that full staffing level was accomplished.

Early in the exercise a determination was made to relocate the OSC-Assembly area to the Refuel Outage Building (ROB) if dose rates in the OSC-Assembly area caused habitability problems. The OSC-Assembly Area Supervisor received conflicting information when the time came to relocate. Better evaluation and coordination between facilities of available information was needed. Dose rate information available in the EOF indicated the ROB was not acceptable as a relocation point due to high radiation levels. The relocation was initiated without regard to the dose rate information available in the EOF. In route to the ROB, the OSC staff encountered a repair team returning from a job assignment which informed the OSC staff of unacceptable dose rates in the area they were moving to. Subsequent communications with the OSC resolved the issue and relocated personnel were correctly directed to a low dose rate area and eventually moved to the EOF.

Some procedures and EP user guides were beyond the two year review period. EPIP 4405, “Response to Personnel Injures,” was past the review date and identified with a "Do Not Use Page." Procedure EPOP 4413, Revision 1, "Potassium Iodine Tablet Control and Use" was past the review date but was not identified with a "Do Not Use Sheet." The evaluators also identified two different revisions of the Onsite Field Monitoring Map, and a 9/88 dated revision of the Millstone Onsite Monitoring Points listing in an emergency equipment cabinet.

Dosimetry supplies, TLDs and finger rings, are maintained in the emergency cabinets. However, no control TLD or finger ring was identified to be stored with or in the adjacent area. Respirators stored in the equipment lockers were labeled with a sticker that read "(mask #) has been approved for use (date)." When questioned, neither controllers nor players were able to provide an answer to how long the respirators were good for to be issued, or where control dosimeters could be found.

Overall, the response actions of the OSC staff successfully demonstrated the licensees ability to staff the OSC and form, dispatch, control and account for multiple field repair teams to take actions inplant to mitigate emergency situations. Minor facility supply concerns and out of date procedure copies detracted from an otherwise good demonstration of emergency response capabilities.

b.4 Emergency Operations Facility (EOF)

The EOF was minimally staffed 38 minutes after the Alert declaration and declared fully operational 7 minutes later. With the transfer of DSEO EOF functions 2 minutes later. EOF SERO personnel appropriately established communication with their respective counterparts. Personnel used procedures throughout the exercise and maintained status boards as data was received and as new or updated information was provided or obtained. During the activation of the EOF, the assigned DSEO was relieved by the affected unit DSEO; however, the relieved DSEO remained in the EOF as the back-up DSEO. The DSEO exhibited very good command and control throughout the entire exercise. Timely briefings were conducted and personnel in the EOF were kept informed of changing plant conditions as they occurred and the DSEO was informed.

There was a very good turnover between the DSEO at the EOF and the Control Room DSEO.

Security was promptly provided at the EOF to control access. The DSEO considered additional security issues throughout the exercise. At the Alert, the Manager of Security (MOS) was requested to determine if the emergency diesel had been sabotaged. The MOS provided a timely assessment which concluded that the damage had not resulted from sabotage. Additionally, in planning for the evacuation of non-essential personnel from the site, the DSEO and MOS effectively coordinated the egress of personnel leaving the site prior to the evacuation being ordered.

Personnel used procedures throughout the exercise and status boards were adequately maintained and updated. However, Controlled Copy 126, “Director Station Emergency Operations EOF/EOC,” had not been updated to include Change Number 23. Additionally, it contained both Revision 21 and Revision 22 to Appendix D, "Supporting Procedures List." Following the exercise, it was noted that Administrative Control Procedures, ACP 8.02, "Fire Fighting Training Program," which is identified in Appendix D as a supporting procedure, is now a Nuclear Training Procedure, NTN-7.207, “Millstone Site Fire Protection Training Program."

Although Protective Action Recommendations (PARs) were provided in a timely manner, there was confusion regarding the basis for the General Emergency (GE) declaration The Assistant Director Technical Support (ADTS), located in the TSC/OSC, indicated that the GE was based on the loss of all three fission barriers at 1249 hours. The Technical Information Coordinator, located in the EOF, demonstrated an excellent working knowledge of the Emergency Action Levels by reviewing and indicating to the DSEO that plant conditions, at that time, did not support the loss of all three barriers. The ADTS re-evaluated the classification and changed the basis to loss of 2 barriers with the potential loss of the third. The GE classification remained appropriate, however, this delayed the development of PARs, which were subsequently issued at 1303 hours. Shortly thereafter, the third barrier was loss and revised PARs were provided at 1312 hours.

Dose Assessment

The EOF Radiological Dose Assessment Team (RDAT) members demonstrated good teamwork throughout the exercise. The RDAT routinely discussed potential release pathways as plant conditions deteriorated. They carefully tracked Radiological Monitoring Team (RMT) past and current doses, and took early action to extend administrative limits and to invoke higher legal exposure limits for activities in progress.

The Radiological Assessment Engineer (RAE), who is operator of the Accident Dose Assessment Model (ADAM) computer, was very fast and efficient in performing his duties of calculating source term, performing dose projections, and correcting projections based upon field monitoring data. ADAM system printer output speed became the limiting factor in his generation of updated dose projections.

The EOF Radiological Dose Assessment Team (RDAT) had difficulty obtaining accurate plant system status upon which to base radiological release assumptions (e.g., heating ventilation and air conditioning (HVAC) damper status, HVAC fan operating status, Containment pressure, reactor building and turbine building area radiation monitor readings, and plant drawings depicting the release pathway). Accurate plant system status was not available in the emergency operations center area of the EOF. Better liaison with the TSC and/or the CR in the future should provide the necessary plant system information and status.

RDAT personnel did not have the systems knowledge, or the benefit of a technical advisor to help them understand that the Standby Gas Treatment System (SBGTS) operational status (i.e., on/off) would have had negligible effect on the filtration of the release simulated. RDAT personnel should receive refresher training on the major plant systems in release pathways.

The use of the term TEDE (Total Effective Dose Equivalent), by RDAT members, as an hourly number, and the use of a TEDE to DDE (Deep Dose Equivalent) ratio terminology, rather than just computing and discussing TEDE as defined in EPA-400 and 10 CFR 20, created unnecessary confusion.

The overall performance of the EOF Radiological Dose Assessment Team (RDAT), under the direction of the Manager of Radiological Dose Assessment (MRDA), was good. This positive statement is within the context of the teams' use of their existing procedures and equipment, and the scenario data presented.

Mathematical, terminology, and underlying assumption errors and questions in the dose assessment procedures and computer codes are summarized separately in the appraisal section of the report.

b.5 Scenario and Exercise Control

Some exercise scenario radiological and meteorological data was either lacking or not representative of the accident sequence simulated. Examples include: No detailed meteorological forecast data was provided; all radiological isopleth plots were in disagreement with the tabular radiological monitoring point (RMP) data by as much as a factor of 10, thus rendering the isopleth plots unusable by the RMT controllers; main steam line monitor data was erroneously reduced to 10 mr/hr, for the remainder of the exercise, following the anticipated transient without scram (ATWS) event (i.e., no accounting for direct shine from containment); no data scatter was introduced for instruments having two channels (e.g., Containment high range monitors); and, in-plant radiological data was "prompt jumped" to maximum levels at the very outset of the LOCA event, and then reduced throughout the remainder of the scenario timeline (i.e., the radiological data was increased prior to any core uncovery, fuel gap release, or release of significant inventory from the reactor vessel to containment).

b.6 Licensee Interface at State Emergency Operations Center (SEOC)

Following the declaration of the Alert, the Northeast Utilities (NU) Executive Spokesperson (ES) and supporting NU representatives arrived at the State EOC at about 1030. The ES oversees the actions of all NU representatives at the SEOC including the Nuclear News Manager and staff. The ES immediately established communications and began getting information on the plant status and conditions by speaker phone from the DSEO in the EOF as well as from the NU Technical Assistant (TA) in the SEOC via the OFIS.

The ES interacted very effectively with the State emergency response organization (ERO) staff, in particular the Office of Emergency Management (OEM) and Department of Environmental Protection (DEP) Directors. The ES presented information on plant status and protective action recommendations in a clear and confident manner at SEOC staff meetings, briefings of the mock Governor, and at Joint Media Center (JMC) briefings. The State decision makers relied to a great extent on the information provided by the ES in developing their understanding of the situation and in determining protective actions.

The SEOC was informed that a GE - Alpha had been declared as of 1249 based on the loss of three fission product (FP) barriers. Because of questions which arose in the SEOC concerning why there was no apparent radiation release with the loss of three FP barriers, the ES and staff attempted to verify the status of the FP barriers. Information was received from the EOF at 1304 that the GE was classified based on the loss of two FP barriers and the potential loss of the third barrier, the containment. The Assistant DSEO also informed the ES that the protective action recommendation (PAR) was still being developed. (Note: The licensee allows 15 minutes to develop a PAR following the declaration of a GE.) At 1306 a PAR was received to evacuate all communities in Zones 1 and 2 and to shelter Zone 3. (Evacuating all communities in Zones 1 and 2 is

equivalent to evacuating a 5 mile radius.) Based on this information, the ES briefed the Governor that a GE - Alpha had occurred based on the loss of two FP barriers and potential loss of the third, and that the NU PAR was to evacuate a 5 mile radius and shelter 5 to 10 miles. The State DEP concurred in the PAR. At 1316 the Governor authorized the emergency alert message (EAS) to be issued informing the public of the protective action decision. (The Governor's authorization to issue the EAS message is the initiation of the 15 minute notification requirement, as evaluated by FEMA.)

At 1316 information was received in the SEOC that the licensee was revising the PAR, that additional communities in the downwind direction between 5 and 10 miles (East Lyme, Old Lyme, and Lyme) were being included in the evacuation PAR. The ES received information from the EOF that the PAR had been revised because the third FP barrier had been lost. Based on the revised licensee PAR, the State decided to revise its PAR to evacuate all of Zone 3, the 5 to 10 mile radius, despite the concern that revising the PAR in such a short time would cause a loss of credibility with the public. (The Governor's Press Secretary felt that this would not be a loss of credibility problem because the State was reacting to changing plant conditions.) At 1329, the Governor authorized the EAS message to be issued informing the public of the change in protective actions.

Another information issue at the SEOC concerned the radioactive material release pathway. The ES received conflicting information from the EOF concerning whether the release was filtered or unfiltered. As a result, the SEOC staff considered the release to be filtered in their dose calculations and in their decision-making, in particular, in the decision concerning potassium iodide for emergency workers. The EOF also did not provide meteorological forecast information in response to requests from the DEP staff in the SEOC.

The NU Director of Corporate Communications, who is in training to fulfill the ES position, provided critical assistance to the ES especially during periods of rapidly changing plant conditions. The ES assistant or deputy position is not identified in the ES procedure, NUC EPOP 4455B, Rev. 1.

The ES performed very well in concisely summarizing the plant conditions and responding to questions in briefings at the Joint Media Center (JMC). However, the visual aids available to the ES in the JMC could be improved to assist in the presentation.

The ES also reviewed and concurred in the NU news releases before they were issued. Six news releases were issued during the course of the exercise. The inspectors noted that none of the news releases contained protective action information. While it is understood that the issuance of protective action information to the public is the responsibility of the State of Connecticut, it would be helpful if the NU news releases contained a reference to the State of Connecticut releases for protective action information.

The overall performance of the ES in the SEOC and JMC was very good. The ES effectively interacted with the SEOC decision making staff and provided invaluable information and support which enhanced the performance of the SEOC staff.

b.7 Licensee Exercise Critique

The licensee's critique was very comprehensive and identified all of the concerns identified by the NRC inspection team.

c. Overall Exercise Conclusions

Overall the licensee site emergency response organization (SERO) performance was good. No exercise weaknesses were identified. Good command and control was demonstrated in all emergency response facilities. Communications within and between facilities, and with the State of Connecticut were good. The licensee adequately demonstrated its ability to implement the emergency plan.

EMERGENCY PREPAREDNESS PROGRAM REVIEW

An inspection of the emergency preparedness program was conducted during the period of August 25 - 29, 1997.

The inspection team utilized the guidance of Inspection Procedure 82206, “Knowledge and Performance of Duties (Training),” in conducting interviews and scenario (tabletop) walkthroughs to determine whether emergency response personnel understand and can perform their assigned functions. Functions focused on during this inspection included:

- emergency detection and classification according to Emergency Action Level (EAL) schemes for plant emergency conditions;
- notifications and communications with on-site personnel and off-site authorities;
- on-shift dose calculations and assessment; and
- formulation of on-site protective actions and off-site protective action recommendations (PARs).

The scope of the walkthroughs included five of six control room (CR) crews from Millstone Point Unit 3 (MP3), and two management groups of the Emergency Operations Facility (EOF) and Technical Support Center (TSC) Staff. The CR crew "staff" consisted of the Shift Manager (SM), the Shift Technician (ST) performing communications, and the Chemistry Technician (CT) performing on-shift dose assessment. Absent were the Unit Supervisor (US) and the Shift Technical Advisor (STA) who would normally provide recommendations concerning classification to the SM. All table top interviews were performed in the EOF due to simulator use and control room activity.

The management groups were members of the Site Emergency Response Organization (SERO) that would be activated by the SM in event of an Alert classification or higher. For the table tops, the groups consisted of the Director of Site Emergency Operations (DSEO) and Assistant Director Emergency Operations Facility (ADEOF) normally stationed in the EOF, the Assistant Director Technical Support (ADTS) normally stationed in the TSC, and the EOF Shift Technician (communicator). The Millstone site Emergency Plan and implementing procedures require the ADTS to relieve the SM of classification responsibilities, and the DSEO to relieve the SM of notification and PAR formulation responsibilities after SERO activation.

Scenarios for each of the seven groups interviewed were selected from a pool of ten licensee-prepared scenarios. Two scenarios were presented to each group by licensee personnel representing disciplines of operations and radiological assessment; plant specific conditions and parameters not included in the written portions of the scenarios handed out to participants were available by questioning the licensee facilitators. Most response actions were simulated except dose calculations and notification computer operation. Guidelines for conduct of the interviews were discussed with the groups before starting. Each scenario "run" consisted of a description of deteriorating plant conditions over a simulated period of 15 to 30 minutes, read to the interviewees, and then handed out, by the licensee operations

facilitator. An initial classification of Alert or Site Area Emergency

was required; the inspection team observed and timed the response activities. After completing initial response activities, an additional description of further plant deterioration resulting in radiological release necessitating a General Emergency (GE) classification, dose assessment, and formulation of PARs was delivered to the interviewees for observation of continued response. Each scenario required approximately one hour to complete for a total of two hours per group. The following sections summarize the observations and conclusions in each of the listed areas.

P1 Conduct of EP Activities

P1.1 Emergency Detection and Classification

a. Scope

To determine that the licensee's standard emergency classification and action level scheme, the bases of which include facility systems, effluent parameters, and projected offsite doses, is clear and unambiguous.

b. Observations and Findings

In eighteen of twenty classification (or re-classification) opportunities among five shift managers, SMs correctly classified events in an average of 5.5 minutes. In two of twenty classification opportunities, the SM conservatively classified at one class higher than expected due to information provided by facilitator verbalizations filling in with requested information. On one occasion, it was unclear from facilitator information what color the critical safety function would have been when viewed on the Safety Parameter Display System (SPDS). On the second occasion the facilitator stated that the dose rate observed at one foot from a one liter primary sample was 35 mR/hr. The interviewee misunderstood or misinterpreted the verbal information and implemented the associated EAL of "Dose Rate at One Foot from Unpressurized RCS Sample $\geq$ 30 mR/hr/ml".

In nine classification opportunities among two ADTSs, eight correct classifications were performed within fifteen minutes. The ninth opportunity consisting of evaluation and interpretation of adverse plant conditions was not able to be classified within fifteen minutes. The DSEO was then provided alternative information of field radiological data which was promptly recognized by the DSEO and ADTS, resulting in a correct classification.

c. Conclusion

Shift Managers from MP3 were able to correctly detect and classify postulated events in a timely manner. Due to the small sample size and uncertain method of presentation of scenarios to ADTSs, the team did not asses the ADTS classification responsibilities.

P1.2 Notifications and Communications

a. Scope

To determine whether the licensee is maintaining a capability for notifying and communicating among licensee personnel, offsite authorities and supporting agencies, and the population within the emergency planning zone (EPZ) in the event of an emergency.

b. Observations and Findings

During nineteen of twenty notification opportunities (associated with classifications performed by the SM), Shift Technicians (ST) "completed" notifications, including obtaining real-time meteorological data, filling appropriate Incident Report Forms, obtaining DSEO approvals, and utilizing the Emergency Notification and Response System (ENRS) correctly in an average of seven minutes. One ST did not complete the notification in a timely manner due to non-familiarity with a Time Sharing Option (TSO) terminal networking the Off-site Facilities Information System (OFIS) for meteorological data.

During nine of nine notification opportunities (associated with classifications performed by the ADTS), the ST "completed" notifications utilizing the ENRS correctly in a timely manner.

c. Conclusion

Licensee personnel performed their notification responsibilities correctly in a timely manner; however, one ST may require additional training to ensure timely notifications in the event watch rotation necessitates use of equipment located in the EOF.

P1.3 Protective Action Decision Making

a. Scope

To determine whether the licensee maintains a 24-hour a day capability to assess and analyze emergency conditions and to make recommendations to protect the public and onsite workers.

b. Observations and Findings

In ten of ten opportunities among five shift managers for determining protective actions for onsite personnel, appropriate actions of assembly and accountability were initiated in accordance with procedure.

For four correctly computed, on-shift dose assessments performed by the Chemistry Technicians, Shift Managers correctly interpreted the results and correctly modified the "understood" (default) PAR that is initially transmitted with a GE declaration.

One of one Shift Managers specifically questioned did not understand what demographic zones were affected with what public action (evacuation, shelter) upon issuance of a GE, Posture Code Alpha, classification. In particular, the SM did not realize the declaration would result in evacuation of a five mile radius.

One Shift Manager did not properly implement an upgraded PAR after consideration of on-shift Dose Assessment results. NUC EPOP 4428G, Rev. 2, Protective Action Recommendations, requires transmission of PARs to the 24 hour Department of Environmental Protection (DEP) dispatcher in Hartford prior to State Emergency Operations Center (EOC) activation. The SM was prepared to notify each local jurisdiction of his revised PAR.

One of two Shift Managers was unable to revise the "understood" (default) PAR accompanying a GE, Posture Code Alpha, declaration when three fission product barriers were "lost" subsequent to the initial declaration. NUC EPOP 4428G, Rev. 2, “Protective Action Recommendations,” requires an upgraded PAR to five-mile radius, ten miles downwind, in event of "Loss of 3 fission product barriers".

Upon receipt of dose assessment results necessitating upgrading of the "understood" PAR accompanying the GE declaration (four opportunities), the ADEOF correctly interpreted the results and recommended a revised PAR to the EOF DSEO for implementation.

c. Conclusion

Control Room Director(s) of Site Emergency Operations (CR DSEO) and EOF SERO staff demonstrated a capability to make recommendations to protect the public and initiate protective actions for onsite workers. However, additional training may be warranted for Shift Managers in PARs affecting the public.

P1.4 Dose Calculations and Assessment

a. Scope

To determine whether the licensee has the ability to perform dose assessment under accident conditions.

b.1 Observations and Findings (for on-shift Chemistry Technicians)

Among five Chemistry Technicians (CTs), four of ten dose assessment computation opportunities were performed correctly in an average of nine minutes. Six of ten computation opportunities were performed incorrectly.

Of six incorrect dose assessment computations, one Shift Manager detected the errors made by the CT when presented the calculation for review.

Several Shift Managers have not integrated the efforts of the CTs into the shift organization. As a consequence, CTs frequently had little direction concerning their activities.

Specific examples of problems encountered and errors committed in the performance of on-shift dose assessment include the following:

- The Chemistry Technicians generally had difficulty accessing radiological and meteorological data on the OFIS data terminals. Access to OFIS data typically took greater than 5 minutes, with some CTs taking over 10 minutes.

- Some CTs used the wrong attachments to EPOP 4432 Rev. 0, On-Shift Dose Assessment, for the release being simulated in the walkthroughs (e.g., Attachments for Steam Dumps used when the release path was via Auxiliary Feed Water Terry Turbine exhaust).

- Some CTs and SMs mistakenly believed that EPOP 4432 contained methods for dose assessment utilizing inputs from water chemistry samples and containment high range radiation detectors. Most Chemistry Technicians believe a "release" must be in progress to begin utilization of EPOP 4432.

- Approximately half of the CTs made substantial human factors and math errors in using the attachments to EPOP 4432, including entering the wrong stability class (+/- convention problem for delta temperature), converting millirem per hour (mr/hr) to Rem per hour (R/hr), and use of exponential values (e.g., E-3, 10^{-3}, converting ur/hr to mr/hr, etc.).

- Some CTs and SMs had a misconception that releases via steam relief and dump valves were "unmonitored releases," causing them to select the "unmonitored release" attachment (9) versus one of the attachments customized for the monitored release path (e.g., Attachment 6). This misconception appeared to be related to material in radiation monitor handbooks and associated lesson plans that describe the inability of the main steam line monitors to detect a release of normal reactor coolant following a steam generator tube break and the decay of nitrogen 16 following a reactor trip.

c.1 Conclusion (for on-shift Chemistry Technicians)

Shift Chemistry Technicians (CTs) had great difficulty using EPOP 4432. Shift Managers (SMs) familiarity with EPOP 4432 was insufficient to assure their ability to perform a quality assurance check of the CT's work. Problems noted during the walkthroughs are attributed to a combination of poor human factors design of EPOP and lack of training on the EPOP for CTs and SMs.

b.2 Observations and Findings (for RDAT members)

The inspection team also conducted scenario walkthroughs and problem solving interviews for core members of the SERO Radiological Dose Assessment Teams (RDAT). Personnel involved in the two hour long sessions were the Manager of Radiological Dose Assessment (MRDA), the Assistant Manager of Radiological Dose Assessment (AMRDA), and the Radiological Assessment Engineer (RAE). Three sessions were conducted for the RDAT teams not involved in the

August 21, 1997 Exercise. The first two sessions involved a walkthrough of the scenario used during the August 21, 1997 Exercise, with minor additions and corrections to the basic scenario being provided by the inspection team. The third session involved the presentation of three discrete dose assessment problems. These three problems were, (1) Computation of the Iodine concentration, based upon a field air sample using a silver zeolite cartridge, (2) Computation of Unit 1 Stack Iodine release rate using a silver zeolite cartridge removed from the Kahman stack monitor, and (3) Performing a "What If" projection based upon probable use of the MP2 Terry Turbine following a steam generator tube rupture. The sessions were conducted in the RDAT room in the Millstone EOF, with open access to all available references and computers. The inspection team played the role of all personnel with whom the RDAT members communicated. Results of these walkthroughs are summarized below.

- RDAT members had difficulty selecting among the assessment options available in EPOPs 4428E (Post-Accident Release Rates), 4428F (Refined Dose Assessment), 4428H (Radionuclide Deposition and Dose Calculation), 4429 (Radiation Monitoring Team Deployment and Control), 4435 (Drywell/Containment Curie Level Estimate), 4439 (Unit 1 Core Damage Estimate), 4445 (Unit 1 RX Coolant and Liquid PASS), and 4446 (Unit 1 Stack and Drywell Air PASS).

- Various attachments from the above family of EPOPs are required to be completed as a prerequisite to performing a dose projection using the ADAM computer system (e.g., to estimate release rate). The two groups involved in the walkthrough took different alternate paths to determine release rate (e.g., using stack monitor readings versus using containment radiation readings and containment hole size/pressure tables).

- The August 21 RDAT completed dozens of required forms in the course of two hours. The walkthrough teams successfully completed less than 5 each over the course of about 2 hours. While satisfactory ADAM dose projections were ultimately obtained, the time required would not support protective action decision-making during an actual event similar to the 21 August exercise scenario. Attachments such as those for "TEDE Limit Reduction Factor Based on DDE" (Attachment 3 of EPOP 4425) were not completed.

During the problem solving session, the following problems were noted:

- RDAT members had difficulty locating the proper attachments (e.g., Attachment 1 to EPOP 4428E, and Attachment 5 to EPOP 4429) for use (problems 1 and 2) in converting iodine sample cartridge counts per minute (cpm) or mr/hr into concentrations and release rates.

- One computation of release rate contained an error of E6.

All RDAT team members involved in the sessions were unsure of the existence and content of detailed procedures for performing gross and/or isotopic iodine estimates based upon use of solver zeolite cartridges installed in the Kahman air sample monitors, or used in a grab sample of stack or drywell atmosphere. Based upon a review of the associated procedures with RDAT members, and later reviews by the inspection team, no detailed procedure for counting "hot" silver zeolite cartridges could be found. Procedures reviewed included: EPOP 4446 (Unit 1 Stack and Drywell Air PASS) and CP-801/2801/3801 AT (Gamma Spectroscopy Counting System Maintenance and Operation). Expected level of detail which could not be found included: A chart or discussion of cpm or mr/hr versus shelf height, calibration or reference source number, location and configuration of increased height shelf supports, and procedures for obtaining a "grab sample" using an air sampler (versus installed Kahman system).

c.2 Conclusion (for RDAT members)

Personnel were not sufficiently familiar with the family of dose assessment procedures to perform radiological dose assessment in the timely manner necessary to support emergency management decision making.

Later discussions with NU Radiological Assessment Branch (RAB) management provided insight as to the lack of familiarity with the dose assessment procedures demonstrated by RDAT members interviewed. Many personnel formerly trained and experienced in the use of the procedures have been transferred to offsite locations, and removed from the SERO. Replacement personnel have not taken the repetitive training and drill/exercise programs necessary to utilize the complex set of procedures proficiently.

P2 Status of EP Facilities, Equipment, and Resources

a. Scope

Determine whether key facilities and equipment are adequately maintained and determine whether changes made since the last inspection are technically adequate, meet NRC requirements, licensee commitments, and are appropriately incorporated into the emergency plan and implementing procedures.

Determine whether changes to emergency facilities, equipment, instrumentation, and supplies have adversely affected the licensee's emergency preparedness program.

b. Observation and Findings

The inspectors toured the Emergency Operations Facility (EOF), Technical Support Center/Operational Support Center (TSC/OSC) and the Operational Support Center Assembly Area (OSCAA). Table 7-1, "Locations of Emergency Response Centers," of the Emergency Plan for Millstone Nuclear Power Station (EPMNPS) list the locations of Emergency Response Facilities (ERFs). However, not all key facilities or their locations, such as the laboratory at the EOF, are

listed. Additionally, the locations are given in general terms and not as discussed in Section 7 of the EPMNPS.

The inspectors identified that emergency facilities and equipment to support the emergency response were not being maintained, an apparent violation of §50.47(b)(8). (VIO 50-245, 336, 423/97-081-01). Examples are as follows:

- During the tour of the EOF, it was noted that Figure F-3, Appendix F, EPMNPS, "Diagrams and Arrangement of Emergency Facilities," indicates the typical layout for the EOF which is consistent with the actual facility. However, maps, status boards, diagrams, and the "Minimum Staffing Chart" were not described or referenced in the EPMNPS and were not controlled. Additionally, the phone at the Director of Site Emergency Organization (DSEO) desk labeled (203-437-2743) is no longer in service. The licensee indicated an updated version of the telephone directory for the Millstone NPS is on the computer system. However, that system is not backed up with emergency power and upon loss of power, the phone book, which is dated Summer 1995, would be used.

- At the TSC, the inspectors noted that the TSC/OSC reference library contained uncontrolled drawings (S&W DOC NU 12179 ESK-4AA-5 and 12179-ESK-14). The inspectors also noted that both EPIP 4405, "Response to Personal Injuries," and EPOP 4413, "Potassium Iodide (KI) Tablet Control and Issue Agent," Revision 1, effective June 1, 1995, had a sheet over them which indicated "Do Not Use," because both procedures had not met the two year review requirement. If a personal injury occurred or KI consumption was directed, licensee personnel could not respond. The inspectors noted that there was no control over other documents and the facility.

- The inspectors inventoried emergency equipment used by OSC teams dispatched from the TSC/OSC. This equipment is stored in lockers located in the "penthouse" of the TSC. The TSC/OSC Filtration System is located here and some protection to OSC repair teams is provided. However, having workers obtain equipment from these lockers in a radioactive field is not ALARA. The inspectors verified that the equipment, as specified on the inventory form, was in place. However, it was not indicated on these forms which locker(s) were designated to contain which equipment. There were four lockers: two contained the prescribed equipment and two contained other material, equipment, etc., which the licensee indicated would be used in the response. None of this equipment was identified in the EPMNPS or implementing procedures. Additionally, these lockers are not controlled in that they may be accessed by licensee personnel not directly involved in the emergency response program. Consequently, personnel could remove, replace or alter a locker's contents without the knowledge of emergency response personnel. Although the equipment and instruments were in place to support the emergency, there was no control of the lockers to assure that the equipment would

be there when needed for an emergency.

- Oversight, inventory, and calibration of emergency equipment, although under the purview of the Director, Nuclear Emergency Planning Services Department, is within the responsibility of Health Physics, Chemistry, or other NU departments. Inventories are to be conducted quarterly and after use. Although the Health Physics Department conducts inventories quarterly and after use, emergency preparedness equipment inventories were only being performed quarterly. The breathable air portion of Self Contained Breathing Apparatus (SCBA) is maintained under another department. This equipment is neither inventoried or maintained such that the Millstone Emergency Preparedness is aware of its condition to support the emergency response.

- Laboratory equipment at the EOF is under the Chemistry Department for inventory and calibration. However, the facility is used by health physics department personnel. At the time of this inspection, it appeared this equipment was calibrated, however, it was not possible to determine if the emergency preparedness department had been informed.

- During the tour of the emergency response facilities, it was noted that none of these facilities contained a copy of the EPMNPS.

The inspectors toured the OSCAA which provides space for additional SERO personnel outside the TSC/OSC and is located in the William Ellis Technical Support Center (B475), Conference Room C-102. This facility is in the protected area approximately 50 yards west of the TSC/OSC. During the tour of the facility, it was noted that equipment and telephones as specified in the plan and procedures are in place such that additional support personnel needed by the OSC could be obtained.

c. Conclusion

As a result of ERF tours, inspection of emergency response equipment/kits, and a review of the EPMNPS and it implementing procedures, it was determined that information required by 10 CFR Part 50 to assure that the maintenance of these emergency response facilities and equipment would be adequately maintained was not contained in the plan. An apparent violation of §50.47(b)(8) was identified concerning control of information, documents, and equipment in emergency response facilities and for the failure to inventory equipment following use.

P3 EP Procedures and Documentation

a. Scope

If significant or major changes have been made to the emergency preparedness program, assess whether these changes have adversely affected the licensee's overall state of emergency preparedness and have been appropriately incorporated into the licensee's emergency plan and implementing procedures.

Verify that major or significant changes to the emergency plan and implementing procedures have been reviewed, approved, and distributed in accordance with approved licensee procedures and NRC requirements before implementation.

b.1 Observation and Findings

The licensee's emergency plan is titled the "Emergency Plan, Millstone Nuclear Power Station." The licensee implemented Revision 22, of the Emergency Plan in June 1997. Prior to implementing the revision the licensee conducted a review and determined that the revisions being implemented did not decrease emergency plan effectiveness. Revision 22 was issued as a complete revision and replaced all pages of previous emergency plan revisions. In August 1997 the licensee implemented Revision 23 of the Emergency Plan.

The inspectors reviewed selected portions of Revision 22 and 23 of the licensee's Emergency Plan and compared the current plan content with that of the previous revision. The inspectors also evaluated selected portions of the emergency plan using the guidance provided by NUREG-0654, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants," and the standards found in 10 CFR 50.47(b), and the requirements of Appendix E to 10 CFR 50.

The inspectors identified the following specific changes that were implemented by Revision 22 that decreased the emergency plan effectiveness.

- With the implementation of Revision 22, the licensee removed Figure 5-2, "Normal Station Organization Millstone Station," page 5-26, of Rev. 21 from the emergency plan. The removal of this figure from the plan resulted in deleting required information from the plan concerning the plants normal operating organization. The inspectors noted that with the implementation of Revision 23 the licensee has restored this information to the emergency plan.

- In Revision 21, the licensee identified the ability to evacuate personnel to an assembly area in 30 minutes, (Section 6.4.1.D, page 6-11), as one of the protective action that would be implemented when needed. In Rev. 22, this has been changed to a 45 minutes. This is a decrease in the licensee emergency response capability. Guidance in NUREG-

0654, Section J.5, established a time frame of

30 minutes for licensees to be able to account for individuals onsite and ascertain the names of missing individuals. The change from 30 to 45 minutes is a decrease in the licensee response capability and is not consistent with established guidance.

With the implementation of Revision 22, the licensee has altered many of the response capabilities previously identified in Rev. 21.

- In Rev. 21, the licensee had committed to provide four (4) individuals in about 30 minutes to provide for radiation protection access control functions. In Rev. 22, this commitment has been revised to a 60-minute time frame. This is a decrease in the licensees response capability. This change also falls outside of the guidance established by NUREG-0654 for 2 individuals to be available in 30 minutes and 2 additional individuals to be available in 60 minutes.

- Additional review of the licensees commitments for coverage of health physics functional areas in Rev. 21 and 22 identified that no specific provision is made for onsite (out of plant) and inplant surveys capabilities to be augmented at 30 and 60 minute intervals from declaration of events. The licensee also omits the function of access control from onshift capabilities.

- In Rev. 21, the licensee identified a number of position that were committed to be filled within 60 minutes and additional positions to be staff within 75 to 90 minutes. With Rev. 22, the licensee has adapted a new approach to meeting response capability commitments. These changes include identifying a number of positions that are identified as minimum staffing and other positions as augmented staffing. The licensee has not clearly identified the response time for the positions now considered to be augmented staffing. The following are specific examples of functional areas and associated augmented staff positions that no longer have a specific response commitment clearly identified in the emergency plan: Technical Information Communication, Technical Data Communication, Offsite Radiological Dose Assessment, Radiological Radio Communications, Unit System Engineering, Plant Systems Engineering Repair and Corrective Actions (Core Thermal Hydraulics), Operational Support, and Resource Acquisition & Personnel Dispatching. Not specifying a response time for the augmented staff positions results in a decrease in the response capability.

The inspectors identified several concerns when selected portions of the licensee's emergency plan was evaluated using the guide lines found in NUREG-0654. This review identified the following concerns:

- The Licensee's Table 5-1 omits the onshift capability for Mechanical Maintenance and Electrical Maintenance. Table 5-1 also omits identification of coverage for the Rad Waste Operator. The Manager of Security Forces is the only security position mentioned in the Table 5-1, the licensee has omitted the balance of security force capabilities from the emergency plan.

- The position of Station Duty Officer is omitted from the list of on-shift/onsite positions as part of the normal station organization on page 5-1. In Table 5-1, the Station Duty Officer is identified as a position for which one person is available for each unit, when actually there is only one individual identified for the site.

- The cross reference developed by the licensee to correlate NUREG-0654 criteria with specific emergency plan sections that implement the criteria has omitted several sections which more completely address the established evaluation criteria. Several of the reference are inaccurately identified.

- The licensee emergency plan fails to address in a significant and meaningful way the emergency action levels required by 10 CFR 50, Appendix E. Section 4 and Appendix I of the licensee plan provides only minimal information on the existence of the EALs and directs reference to EPIP 4400 for specific details. Appendix I of the licensee emergency plan is essentially a set of pages formatted with boiler plate columns and lines to form a matrix but no details are provided concerning the EALs. The content of Appendix I is inconsistent with information provided in Section 6.2.3.b., "Use of Emergency Action Levels," page 6-6 of Rev. 22, which states that Appendix I contains effluent monitor radiation levels which correspond to precalculated doses, this information has been omitted from Appendix I.

- The list of supporting procedures provided in Appendix D omits several procedures which are referenced in the plan and relied on for complete implementation of the emergency plan. Specific examples include the Emergency Preparedness Departmental Procedures, Emergency Preparedness User Guides, and Radiation Protection Manual chapters 4.8.5, 2.3.4 and 2.3.5.

- Appendix C, EPZ Maps and Monitoring Locations, has omitted several maps utilized by responders. These maps are not identified by the emergency plan nor controlled in any specific programmatic way associated with the emergency plan. Examples of maps included, Millstone Point Onsite Field Monitoring Map, (Revisions 8/98, 10/94,

and 8/97 were identified by the inspectors to be in use), Millstone

Nuclear Power Station Overwater EPZ Monitoring Map as supplement to the EMT Procedures, Rev. 0, dated 1/3/96, Millstone Station Emergency Response Facility Map, DWG No. SK:RH110896, Rev. 1, dated 3/24/97, As-Built, and State of Connecticut Official Millstone Nuclear Power Station EPZ Base Map for RERP, dated 8/85.

- The list of supporting plans and sources in Appendix L omits reference to the emergency plans developed for each local governmental jurisdiction, such as the Town of Waterford. The resources of the Seabrook Station which are relied on by the licensee are not listed, nor is the Northeast Utilities Production Operation Services Laboratory included in the resource list. (Both of these facilities are also omitted from Table H-2, "Offsite Assessment Equipment.")

- Several positions identified in the licensees emergency response organization are not clearly described in the emergency plan. Some specific examples include the Accident Management Team (AMT) Leader, AMT Mechanical Engineer(Core Thermal-Hydraulics), and Generation Test Specialist.

- In Section 6.2, Initial Assessment, page 6-3 of Rev. 22, the licensee made the statement, "Real time dose estimates are not performed for fast moving events." This statement is inconsistent with current duties and responsibilities assigned to onshift Chemistry Technician to provide initial dose assessments.

c.1 Conclusion

In accordance with conditions of license, 10 CFR 50.54(q) states, in part: "A licensee authorized to operate a nuclear power plant shall follow and maintain in effect emergency plans which meet the standards in §50.47(b) and the requirements in appendix E of this part...The nuclear power reactor licensee may make changes to these plans without Commission approval only if the changes do not decrease the effectiveness of the plans and the plans as changed continue to meet the standards of §50.47(b) and the requirements of appendix E to this part..."

The inspectors concluded that with the implementation of Revision 22 the licensee made changes to the emergency plan which decrease the emergency plan effectiveness. The changes were made without commission approval. In some instances the plans as changed no longer meet the standards of 10 CFR 50.47(b), and the requirements of Appendix E. This is an apparent violation of NRC requirements. (VIO 50-245, 336, 423/97-81-03)

b.2 Observations and Findings-Dose Assessment Procedures

The inspection team performed a detailed review of twelve of the dose assessment related EPOPs during the course of the inspection. The examples provided below are those for which no onsite resolution was satisfactorily completed.

The On-Shift Dose Calculation Procedure (EPOP 4432) had the following problems:

- Misuse of term total effective dose equivalent (TEDE) (e.g., TEDE in EPOP 4432 included only DDE and is on Per/Hour basis).

- Thyroid CDE (which is needed in the Protective Action Procedure EPOP 4428G) is not computed.

- Plant Chemistry Technicians had great difficulty using the procedure in the walkthrough environment (average time to complete a calculation was about 12 minutes - major errors were generated in over 50% of the calculations performed).

- Mathematical inconsistencies were found in conversion factors among the various attachments to EPOP 4432; and EPOP 4432 did not include a means for computing releases via Unit 2 Terry Turbine or Unit 1 Hard Vent.

The ADAM Dose Assessment Code had the following problems which detract from use of the system in a timely manner to compute TEDE:

- ADAM does not compute ground deposition or the ground deposition contribution to TEDE (As defined in EPA-400).

- ADAM does not compute the CEDE values for nuclides released (Another TEDE contributor).

- The data entry forms (4428 series procedures) are cumbersome and overly complex.

General use and definition of the term TEDE, across several procedures and training lesson plans, is not consistent with EPA-400 or 10 CFR 20. Examples include:

- EPOP 4428F stated that TEDE includes ingestion pathway and resuspension of ground deposition (Not part of EPA defined TEDE).

- TEDE was defined in hourly terms in most procedures, versus being defined as total dose over the projected duration of a release.

Procedures contain far too many disclaimers and warnings that TEDE will essentially always consist of only whole body plume exposure dose, and that other contributors are too difficult or unreliable to estimate and project; and the related lesson plan "Radiological Assessment Engineer" (EP-G013-RAE) contains totally false and technically inaccurate guidance such as "... DDE and the factor of CDE thyroid will be sufficient to calculate TEDE".

The family of 4400 series procedures contained far too many redundant options for the average Radiological Dose Assessment Team (RDAT) member to assimilate and use reliably to arrive at hand and computer based dose projections. All RDAT groups interviewed had difficulty selecting among the options, and in using the options in a sufficiently rapid manner to support emergency management decision-making.

Extensive discussions were held with RDAT members and RAB personnel concerning conversion factors used in the large family of dose assessment procedures (EPOP 4400 series). Questions remain on conversion factors for using a frisker or gamma dose rate instrument to obtain a rough estimate of silver-iodide cartridge gross iodine content, and consequently uci/cc concentration, or release point Ci/sec values. This unresolved question applies to field samples, Kahman Monitor samples, and HVAC/Containment grab samples. Similar questions remain concerning the basis for conversion factors for installed process monitors (e.g., Main Steam Line Radiation Monitors). A technical basis for most of the above types of conversion factors was not contained in the basis documents for individual procedures, and was not delivered from the radiological assessment branch (RAB) reference files to the inspection team during the period of the onsite inspection.

Many calculations in the EPOP 4400 series procedures were understood only by the original authors, based on interviews where interviewees interpreted the procedures at face value, as did the NRC inspection team (because underlying assumptions are not clearly stated). Examples include:

- Containment release rates through varying size holes, at various pressures, were being interpreted as Cubic Feet per Minute (CFM) at Standard Temperature and Pressure (STP), versus the authors' intention of the CFM values representing "Cubic feet of the portion of pressurized containment atmosphere above atmospheric pressure"

- Terminology for amounts and concentrations of iodine varied from procedure to procedure, and within procedures, among "Gross Iodine" and "Dose Equivalent Iodine 131" terminology and underlying assumptions

- Procedures contained far too many footnoted uses of the term TEDE which could, and did, lead the users to apply the term TEDE to dose projection results communicated to both internal and external recipients, when the results computed were not really TEDE.

Procedures allow users to apply decontamination factors (DFs) to potential iodine releases which are three orders of magnitude below current NRC and industry techniques for unfiltered releases. These DF factors are applied to an assumed starting Iodine to Noble Gas (I/NG) ratio in the fuel gap and coolant of 3.7% (Lower than any authoritative text ever estimates). The topic of the beginning assumptions for iodine to noble gas ratio in the coolant, for gap and beyond accident scenarios, was still under discussion and unresolved as the onsite portion of the inspection ended. The August 21, 1997 scenario data assumptions, and the assumptions by the RDAT exercise team, were in the range of E-4 to E-6 I/NG ratio for an unfiltered release. The NU RAB reviewed these assumptions with the NRC Team, without reaching closure.

c.2 Conclusion

The combination of misuse of the term TEDE, lack of a rapid means to compute TEDE, mathematical errors, complex options, questionable assumptions, and typographical/human factors problems in the dose assessment procedures warrants a complete review and upgrade program. Licensee Emergency Preparedness management concurred in this conclusion at the end of the onsite inspection period. This along with the inability to perform dose assessment in a timely manner to provide protective action recommendation upgrades, as discussed in Section P1.4 is an apparent Violation of 10 CFR 50.47(b)(9) which states; “Adequate methods, systems, and equipment for assessing and monitoring, actual or potential offsite consequences of radiological conditions are in use.” (VIO 50-245, 36, 423/97-081-04)

P5 Staff Training and Qualification in EP

a1. Scope

The inspectors assessed whether emergency response personnel have received training, whether they understand their emergency response roles and authorities, and whether they can perform their assigned functions.

b1. Observations and Findings

The inspectors learned, through their discussions with the EP training staff, that the licensee's entire training program had been subjected to a recent review. Adverse results from both external and internal audits resulted in the suspension of training pending the revision of the training product at the lesson plan level. The EP training curriculum was included in the training programs that needed to be "restarted".

The restart effort for an individual training program required the completion of an explicit review methodology to ensure that the program adhered to the principles to the Systematic Approach to Training (SAT). All of the SAT principles were covered in the methodology except the incorporation of long-term feedback from job performance into revision of the subject program. The licensee had deferred the formal development of this feedback process to a later date.

At the time of the inspection, the EP training staff had revised 13 of 37 programs in the EP training curriculum for Millstone Station. Five of these 13 programs had been implemented after their restart. The inspectors reviewed three of these 13 programs to determine the acceptability of the training. The training programs reviewed had all the restart certification documentation appropriately filled out and were consistent with the principles of SAT-based training. The inspectors noted that there was no defined method of ensuring that changes to EP procedures and equipment was reflected in changes to the training programs. The licensee does, however, use Curriculum Advisory Committees (CACs) extensively to provide a liaison between the line organizations and the training department. These CACs would provide the necessary feedback to the training department of changes to the procedures or equipment.

The inspectors reviewed the task list for SERO positions and noted some positions did not have lesson plans listed in which the tasks were covered. EP training staff stated that this was due to the applicable lesson plans not being restarted. The inspectors found several examples where the training specified for members of the ERO did not meet the tasks they were expected to perform either as specified on formal task lists or conventional practice. For example, the inspectors reviewed the task list for STAs for Unit 3, which specified such EP-related tasks as classification of emergency conditions, offsite dose calculations, protection of on-site personnel and emergency plan implementation as those in which the STA would participate. Two of three shift managers interviewed stated their expectations that the STA would assist in the classification of emergency events. The inspectors noted the STA who performed in the August 21, 1997 exercise was intimately involved in the emergency action level classification of degrading plant conditions.

The training expectations for the STA, however, do not require specific training in these areas. The emergency plan and the training procedure only require that the STA receive overview training. The same training requirements exist for the Station Duty Officer (SDO), who is listed in Revision 23 of the emergency plan as responsible for assisting with NRC notifications, communications, and evacuation of onsite personnel. The SDO, having discrete emergency duties, involving operation of communication equipment, should be given specialized training in the use of this equipment.

Also, Revision 23 of the emergency plan does not require radiation worker training for certain ERO positions, although such training is appropriate. For example, the Shift Technicians, who make offsite notifications of emergency events from the control room, are not required to be radiation worker qualified, although other control room staff members are required to be qualified. EP Department staff informed the inspectors that radiation worker training was in fact required for Unit 3 Shift Technicians by plant management. Similarly, the health physics technicians in the EOF, likewise are not required to be radiation worker qualified although their duties center around radiation surveys and decontamination of personnel.

The performance of some SERO members during the table-top walkthroughs (see Section P1.4) indicated that there were some Shift Managers who were unfamiliar with the procedures for on-shift dose assessment and protective action recommendations. The inspectors interviewed three Shift Managers who stated their complete unfamiliarity with the on-shift dose assessment procedure. Two of the three also stated that they felt somewhat unfamiliar with the latest protective action recommendation procedure, which they had only been exposed to once.

c1. Conclusion

The inspectors concluded that there were some problems with the EP training's adherence to a SAT-based model since the tasks ascribed to be performed by certain positions in the SERO were not adequately reflected in the training requirements specified for those positions. The inspectors could not conclusively state that the training program was adequately preparing SERO members for their positions since the task list-to-lesson plan tie was still undeveloped for some positions. Finally, the inspectors concluded that the performance of the personnel during the walkthroughs, combined with interviews of those persons, indicated that additional training was needed for certain tasks performed on-shift.

b2. Maintenance of SERO Qualifications

a2. Scope

The inspectors checked the qualification training status of a random selection of SERO members to determine if they were receiving the EP training specified by the emergency plan and procedures.

b2. Observations and Findings

The inspectors checked the qualification records of 63 SERO members, including Unit 3 SERO members on-shift. They found only five examples of SERO members who did not have the proper training, and three of these members were inadvertently left on the SERO list after being removed from an on-shift status. The other two examples were plant equipment operators who had not had respirator training since calendar year 1995. EP Department personnel, after being informed of these problems, stated their intent to improve the mechanism for tracking the qualification status of on-shift SERO members.

c2. Conclusions

The inspectors considered the program for tracking and maintenance of SERO qualifications to be well-implemented.

P7 Quality Assurance in EP Activities

a. Scope

Examine independent and internal review and audit reports for the licensee's emergency preparedness programs since the last inspection to determine compliance with NRC requirements and licensee commitments.

Evaluate the licensee's corrective actions for audit identified deficiencies and those identified during drills and exercises.

b. Observations and Findings

The licensee has committed in Section 8.3 of the Millstone Emergency Plan that annual reviews per 10 CFR 50.54(t) of the Emergency Preparedness Program are performed by the licensee oversight group. Appendix D of the Emergency Plan, Supporting Procedures List, reflects EPAP 1.15, Management Program for Maintaining Emergency Preparedness, as the reference for Emergency Plan Section 8. The team reviewed EPAP 1.15 Rev. 2, and noted that the procedure addressed subjects of on-going maintenance of the program, but was silent on the subject of independent and internal audits.

The team noted that EPDP-12 Rev. 0, Self-Assessment Program, became effective January 15, 1997. EPDP-12 stated that the first two levels of assessment, "Individual" and "Management," were the only assessments considered to be "self assessments". Third and fourth level assessments were described as independent internal and external oversight audits, and not covered by EPDP-12.

The team was provided a copy of Audits and Evaluations Audit Report No. A25113, entitled "Connecticut Yankee/Millstone Station Emergency Plan Audit and 10 CFR 50.54(t) Review for 1996", dated January 24, 1997. The audit was conducted between January 25, 1996 through January 15, 1997. The Executive Summary of the report reflected, "No discrepancies were identified at Millstone Station".

The NRC inspectors were concerned that no discrepancies were identified at Millstone Station during the year long audit period by a team of nine auditors. This situation was different than the experience of the NRC inspection team. An additional concern of the NRC team was that the audit did not appear to include all elements of 10 CFR 50.54(t) such as evaluation for adequacy of emergency preparedness program capabilities and procedures.

In addition to the above report, the NRC team was provided several other reports of audits and assessments, for example, "97-107.wpd, Self Assessment: NU Dose Assessment for Emergency Planning Facilities," dated June 19, 1997. Many of the areas for improvement and deficient performance and practices of the report were noted by the NRC team, but were not

verbalized by Radiological Assessment Branch staff as previously identified concerns at the time of the NRC inspection. No evidence was presented to the NRC inspectors that corrective action was being considered for the report concerns.

c. Conclusion

Based upon the extent of concerns identified by the inspectors review of oversite in the EP area, the inspectors concluded that inadequate audits constituted another apparent violation of 10 CFR 50.54(t). (VIO 50-245, 336, 423/97-081-05)

MANAGEMENT MEETINGS

X1 Exit Meeting

The inspector presented preliminary inspection results to members of licensee management at the conclusion of the inspection on August 29, 1997. The licensee acknowledged the inspector's findings.

The inspector presented the inspection results to Mr. N. Carns, Senior Vice President and Chief Nuclear Officer, and other members of your staff at the public exit meeting conducted on September 8, 1997, at 6:00 p.m. The licensee acknowledged the inspector’s findings.

PARTIAL LIST OF PERSONS CONTACTED

MIllstone Station Personnel

W. Buch, Emergency Planning Coordinator
E. Maclean, Emergency Planning Training
J. Rigatti, Emergency Planning Training
A. Vomasick, Emergency Planing Training Supervisor
B. Nevelos, Director Nuclear Services
D. Gerber, Oversite
M. Covell, Director Corrective Actions
M. Keyes, Emergency Preparedness Coordinator
D. Embrosky, Emergency Preparedness
D. Goebel, Vice President, Oversite
D. Hicks, MP3 Director
J. McElwain, MP1 Recovery Officer
M. Bowling, MP2 Recovery Officer
J. Thayer, Vice President, Nuclear Engineering and Support
M. Brothers, MP3 Recovery Officer
P. Stroup, Director, Emergency Preparedness Services Department
N. Carns, Senior Vice President and Chief Nuclear Officer
T. Blount, Manager, Emergency Preparedness Services Department
J. Morlino, Exercise Manager, Emergency Preparedness Services Department

INSPECTION PROCEDURES USED

IP 82206: Knowledge of Performance of Duties

IP 82301: Evaluation of Exercises for Power Reactors

IP 82302: Review of Exercise Objectives and Scenario for Power Reactors

IP 82701: Operational Status of the Emergency Preparedness Program

ITEMS OPENS AND CLOSED

Opened

(IFI 50-245, 336, 423/97-81-01): Potential over classification because of EALs CNB4 and CNB5.

(VIO 50-245, 336, 423/97-081-02): Failure to maintain emergency preparedness facilities.

(VIO 50-245, 336, 423/97-081-03): Improper implementation of dose assessment standards, EPA-400 , and 10CFR20 requirements.

(VIO 50-245, 336, 423/97-081-04): Decrease in effectiveness of the emergency plan with prior NRC approval.

(VIO 50-245, 336, 423/97-081-05): Adequacy of oversite review of 10CFR50.54(t) and oversite requirements.

Closed

None

LIST OF ACRONYMS USED

AC	Alternating Current
ADAM	Accident Dose Assessment Model
ADEOF	Assistant Director Emergency Operations Facility
ADTS	Assistant Director Technical Support
AMRDA	Assistant Manager of Radiological Dose Assessment
AMTL	Accident Management Team Leader
ARM	Area Radiation Monitor
ATWS	Anticipated Transient Without Scram
BWR	Boiling Water Reactor
cc	cubic centimeter
CDE	Committed Dose Equivalent
CEDE	Committed Effective Dose Equivalent
CEPG	Central Emergency Preparedness Group
CET	Core Exit Thermocouple
cfm	cubic feet per minute
CFR	Code of Federal Regulations
Ci	Curie
cpm	counts per minute
CR	Control Room
CT	Chemistry Technician
DDE	Deep Dose Equivalent
DEP	Department of Environmental Protection
DF	Decontamination Factor
DSEO	Director Site Emergency Operations
EAL	Emergency Action Level
EAS	Emergency Alert System
EDG	Emergency Diesel Generator
ENRS	Emergency Notification and Response System
EP	Emergency Preparedness
EPA	Environmental Protection Agency
EPMNPS	Emergency Plan for the Millstone Nuclear Power Station
EOC	Emergency Operations Center
EOF	Emergency Operations Facility
EPAP	Emergency Plan Administrative Procedure
EPDP	Emergency Plan Departmental Procedure
EPIP	Emergency Plan Implementing Procedure
EPOP	Emergency Plan Operating Procedure
EPZ	Emergency Planning Zone
ERF	Emergency Response Facility
ERO	Emergency Response Organization
ES	Executive Spokesperson
FEMA	Federal Emergency Management Agency
FPB	Fission product barrier
GE	General Emergency
gpd	gallons per day

gpm	gallons per minute
hr	hour
HP	Health Physics
HVAC	Heating, Ventilation, and Air Conditioning
I/NG	Iodine to Noble Gas (ratio)
IRF	Incident Report Form
JMC	Joint Media Center
LOCA	Loss of Coolant Accident
MCRO	Manager of Control Room Operations
MNPS	Millstone Nuclear Power Station
MP1	Millstone Point Unit 1
MP2	Millstone Point Unit 2
MP3	Millstone Point Unit 3
MPC	maximum permissible concentration
ml	milli-liter
mR	milli-Roentgen
uCi	micro-Curie
MOS	Manager of Security
MOSC	Manager of Operational Support Center
MRDA	Manager of Radiological Dose Assessment
NRC	Nuclear Regulatory Commission
NU	Northeast Utilities
NUREG 0654	Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants, NUREG 0654 FEMA-REP-1, Revision 1
OEM	Office of Emergency Management
OFIS	Off-site Facilities Information System
OSC	Operational Support Center
PA	Public Address system
PAR	Protective Action Recommendation
PASS	Post Accident Sample System
PEO	Plant Equipment Operator
P&ID	Piping and Instrument Drawing
QA	Quality Assurance
RAB	Radiological Assessment Branch
RAE	Radiological Assessment Engineer
RCS	Reactor Coolant System
RDAT	Radiological Dose Assessment Team
RERP	Radiological Emergency Response Plan
RMP	Radiological Monitoring Point
RMT	Radiological Monitoring Team
ROB	Refueling Outage Building
SAE	Site Area Emergency
SBGTS	Standby Gas Treatment System
SCR	Simulator Control Room
SDO	Station Duty Officer
SEOC	State Emergency Operations Center

SERO	Site Emergency Response Organization
SM	Shift Manager
SPDS	Safety Parameter Display System
SRO	Senior Reactor Operator
ST	Shift Technician
STA	Shift Technical Advisor
stp	Standard temperature and pressure
TA	Technical Assistant
TEDE	Total Effective Dose Equivalent
TLD	Thermoluminescent dosimeter
TSC	Technical Support Center
TSO	Time Sharing Option
US	Unit Supervisor